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EXAMINER

BUSS, BENJAMIN J

ART UNIT	PAPER NUMBER
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2129

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/501,378

Applicant(s)

JIN ET AL.

Examiner

Benjamin Buss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/31/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claims 11-20 are pending in this application.

Priority

5 Receipt is acknowledged of papers submitted for Applicant's claim for priority as a 371 of PCT/EP02/14002 filed on **12/10/2002**, which papers have been placed of record in the file.

 Receipt is acknowledged of certified papers submitted Applicant's claim for priority based on 02001252.2 filed in Europe on 1/17/2002, which papers have been placed of record in the file.

 Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Europe on 10 2/15/2002. It is noted, however, that applicant has not filed a certified copy of the 02003557.2 application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

 The listing of references in the specification is not a proper information disclosure statement (see pages 3 and 15-16). 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by 15 the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

 The disclosure is objected to because of the following informalities:

- Remove "WO 03/060821" and "PCT/EP02/14002" from all pages of the specification as they obscure the fact that this is an application for a U.S. Patent.

 Appropriate correction is required.

25

Drawings

 The drawings are objected to because "WO 03/060821" and "PCT/EP02/14002" appear on each page of the drawings, obscuring the fact that this is an application for a U.S. Patent. Remove these labels from all drawing

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pages. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 11-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4, 6-7, and 14-17 of copending Application No. 10/007,906 in view of **Fonseca** ("Multiobjective Optimization and Multiple Constraint handling with evolutionary Algorithms – Part I: A Unified Formulation") and also in view of **Jin** ("Adapting Weighted Aggregation for Multiobjective Evolution Strategies").

All features of claims 11 and 15-20 of the instant application are clearly present in claims 1-4, 6-7, and 14-17 of copending Application No. 10/007,906 except "wherein weight intervals of different sub-functions have

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different values to reflect different priorities of the underlying objectives". This limitation is met by **Fonseca** as detailed in the rejection under 35 U.S.C. §103 below. Furthermore, the limitations recited in claims 12-13 are also met by **Fonseca** as detailed in the rejection under 35 U.S.C. §103 below.

The limitation of claim 14 is met by **Jin** as detailed in the rejection under 35 U.S.C. §103 below.

5 This is a provisional obviousness-type double patenting rejection.

Claim Objections

Claims 13 and 20 are objected to because of the following informalities:

- Claim 13: The phrase "letting the parameter take all the allowed value" does not make grammatical sense.
- 10 - Claim 20: Write out as independent.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

- 15 Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 11-20 are rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. The computer system must set forth a practical application of that §101 judicial exception to produce a real-world result. *Benson*, 409 U.S. at 71-72, 175 USPQ at 676-77. The invention is ineligible because it has not been limited to a substantial practical application. In the present case:

- Claims 11-18 and 20 are directed to setting up and manipulating abstract data with an evolutionary algorithm, which is a mere manipulation of abstract ideas. Abstract ideas (see *Wamerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759) or mere manipulation of abstract ideas (see *Schrader*, 22 F.3d at 292-93, 30 USPQ2d at 1457-58) are not patentable.
 - Claim 20 is further rejected as being directed to software, per se, which is not patentable.
 - Claims 11-20 are rejected under 35 U.S.C. §101 because the claimed invention lacks a patentable utility. The claims lack a stopping criteria, and therefore are directed to an infinite loop such that no practical functionality can be realized.
- 30

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- Claims 12 and 13 are further rejected for lacking a concrete result since they rely on unrepeatable input (e.g. human preferences).

The courts have also held that a claim may not preempt ideas, laws of nature or natural phenomena. The concern over preemption was expressed as early as 1852. See Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1852) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."); Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 132, 76 USPQ 280, 282 (1948).

Accordingly, one may not patent every "substantial practical application" of an idea, law of nature or natural phenomena because such a patent "in practical effect would be a patent on the [idea, law of nature or natural phenomena] itself." "Here the "process" claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure-binary conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus." Gottschalk v. Benson, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

Claims 11-18 and 20 preempt substantially all practical applications of evolutionary algorithms, such as optimal circuit design, mechanical optimization, turbine design, military air-frame design, optimizing weights for a neural network used for optical character recognition of written text, creation of art pieces, stock picking, economic forecasting, analysis of biological systems, DNA matching, operations research, path planning in robotics, vote predictions, design of social science experiments, developmental biology research, interactive evolutionary computation, program synthesis, music classification, scheduling/timetabling, compromise generation for negotiation processes, underwater vehicle navigation, etc.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claims 11-20 are also rejected under 35 U.S.C. 112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a 101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application. This is how the MPEP puts it:

5 ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, '376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with §112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention.**"). See, MPEP §2107.01 (IV), quoting In re Kirk (emphasis added).

10

Therefore, claims 11-20 are rejected on this basis.

15 **Claim Rejections - 35 USC § 112**

Claims 11-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- 20 - Claims 11 and 20: No description or support has been found in the specification for the limitation of "wherein weight intervals of different sub-functions have different values to reflect different priorities of the underlying objectives". This appears to be new matter introduced in the preliminary amendment filed 7/13/2004.
- Claim 19: The calculation of an outlet angle by a Navier-Stokes solver and geometric constraints is not
- 25 described anywhere in the specification.
- Claims 12-18 are rejected by virtue of their dependence on a rejected base claim.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

30 The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claim 11-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant discloses that the claimed invention can be applied to many practical applications in

5 mechanical and aerodynamic optimization problems, including:

- preliminary turbine design,
- turbine blade design,
- multi-disciplinary rotor blade design,
- multi-disciplinary wing platform design,
- 10 ○ military air-frame preliminary design.

Applicant has not provided evidence for reducing the invention to practice in **ANY** of the above applications within the disclosure. Thus the person of ordinary skill in the art(s) above would not be enabled to make and/or use the claimed invention for any of these intended uses without undue experimentation. The Applicant has suggested what the invention may be used for, but has not taught one of ordinary skill in the art **how** to do so.

15 Furthermore, claim 19 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. A description of the relationship between the "calculating an outlet angle by a Navier-Stokes solver and geometric constraints" and the multi-objective evolutionary algorithm of claim 11, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Lacking this critical or essential subject matter, the person of ordinary
20 skill in the art at the time the invention was made would not have been able to practice the invention of claim 19 without a serious burden from undue experimentation.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

25 The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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- Claims 11 and 20: it is not clear what is meant by the limitation "wherein weight intervals of different sub-functions have different values to reflect different priorities of the underlying objectives". What type of priority is meant? How does it affect the weight intervals?
- Claim 13: The meaning of this claim is not clear. The claim recites "letting the parameters take all the allowed value instead of assigning one specific value to each parameter". It is not clear how a parameter can simultaneously represent all the allowed values. It is not clear if the phrase "instead of" indicates that all previous claims do assign "one specific value to each parameter". Examiner is unable to understand what this claim is attempting to cover.
- Claim 17: It is not clear how the weighting accomplishes any purpose if all offspring in each generation have the same weight.
- Claim 19: It is not clear exactly how the method of claim 11 is related to the "calculating an outlet angle by a Navier-Stokes solver and geometric constraints" recited here. If the Navier-Stokes solver and geometric constraints accomplish the optimizing of an aerodynamic or hydrodynamic body, what does the evolutionary algorithm of claim 11 accomplish?
- Claims 12, 14-16, and 18 are rejected by virtue of their dependence on a rejected base claim.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this

Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin ("Adapting Weighted Aggregation for Multiobjective Evolution Strategies") and Fonseca ("Multiobjective Optimization and Multiple Constraint handling with evolutionary Algorithms – Part I: A Unified Formulation").

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Claims 11 and 20:**Jin teaches:**

- setting up an initial population as parents (p96-107 especially §2.1 or Algorithm 1 on page 101);
- reproducing the parents to create a plurality of offspring individuals, the individuals representing object parameters to be optimized (p96-107 especially §2.1 or §2.2);
- evaluating the quality of the offspring individuals by means of a fitness function, wherein the fitness function is composed of the sum of weighted sub-functions that represent an objective (p96-107 especially "Fitness" §2.2 or "weight" throughout);
- selecting the one or more offspring having the highest evaluated quality value as parents for the next evolution cycle, characterized in that for each sub-function of the fitness function, an interval is defined within which the weight of the associated sub-function is allowed to change (p96-107 especially "selection method" §1 or "changed systematically" §1 or §2.1 or §2.2 or "weight combination that is changed gradually and periodically with the process of the evolution" §2.3);
- during the optimization the weights for the sub-functions are changed dynamically respectively within the predefined interval for every weight (p96-107 especially §2.2 or §2.3).

Jin fails to teach:

- wherein weight intervals of different sub-functions have different values to reflect different priorities of the underlying objectives.

Fonseca teaches:

- setting up an initial population as parents (p26-36 especially §IV or §VI.D);
- reproducing the parents to create a plurality of offspring individuals, the individuals representing object parameters to be optimized (p26-36 especially §IV or §VI);
- evaluating the quality of the offspring individuals by means of a fitness function, wherein the fitness function is composed of the sum of weighted sub-functions that represent an objective (p26-36 especially II.B or §IV or §VI.A);
- selecting the one or more offspring having the highest evaluated quality value as parents for the next evolution cycle, characterized in that for each sub-function of the fitness function, an interval is defined

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within which the weight of the associated sub-function is allowed to change (p26-36 especially §IV.B or §VI.A or §VI.D);

- wherein weight intervals of different sub-functions have different values to reflect different priorities of the underlying objectives (p26-36 especially §II.B or §II.A or §V).

5 **Motivation:**

Jin and **Fonseca** are from the same field of endeavor, multiobjective evolutionary algorithms. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of **Jin** by using different weight intervals for different sub-functions to reflect different priorities of the underlying objectives as taught by **Fonseca** for the benefit of determining the order the objectives are to be optimized (**Fonseca** §II.B, §III.A) to accommodate a whole variety of constrained and/or multiobjective problem formulation (**Fonseca** §V).

Claim 12:

Fonseca teaches:

- converting human preferences represented by linguistic preference relations into parameterized, real-valued preference relations to generate the intervals defining the allowed range of weight changes (p26-36 especially §II.A or §V or §VI.C).

20 **Claim 13:**

Fonseca teaches:

- converting the parameterized preference relations into real-valued intervals by letting the parameters take all the allowed value instead of assigning one specific value to each parameter (p26-36 especially §II.A or §V or §VI.C).

25 **Claim 14:**

Jin teaches:

- wherein the weights for the different objectives are randomly re-distributed within the defined intervals among the different offspring individuals in each generation (p96-107 especially §2.2).

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Claim 15:

Jin teaches:

- gradually changing the weights for the different objectives gradually within the defined intervals with the proceeding of optimization (p96-107 especially “weight combination that is changed gradually and periodically with the process of the evolution” §2.3).

Claim 16:

Jin teaches:

- changing the weights within the intervals according to a periodic function (p96-107 especially “weight combination that is changed gradually and periodically with the process of the evolution” §2.3).

Claim 17:

Jin teaches:

- wherein each offspring has the same weight in the same generation (p96-107 especially the caption of Figure 2).

Claim 18:

Jin teaches:

- wherein the periodic change has the shape of a sine function applied on the generation number (p96-107 especially §2.3 or Figure 2).

Claim Rejections - 35 USC § 103

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jin** (“Adapting Weighted Aggregation for Multiobjective Evolution Strategies”) and **Fonseca** (“Multiobjective Optimization and Multiple Constraint handling with evolutionary Algorithms – Part I: A Unified Formulation”) in view of **Oyama** (“Euler/Navier-Stokes Optimization of Supersonic Wing Design Based on Evolutionary Algorithm”)

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Claim 19:

The combination of **Jin** and **Fonseca** fails to teach:

- calculating an outlet angle by a Navier-Stokes solver and geometric constraints to optimize for optimizing aerodynamic or hydrodynamic bodies.

5 **Oyama** teaches:

- calculating an outlet angle by a Navier-Stokes solver and geometric constraints to optimize for optimizing aerodynamic or hydrodynamic bodies (p1-8 especially §1 or §3).

Motivation:

10 **Oyama** and the combination of **Jin** and **Fonseca** are from the same field of endeavor, evolutionary algorithms. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of **Jin** and **Fonseca** by optimizing aerodynamic bodies using a combination of evolutionary algorithms and a Navier-Stokes solver as taught by **Oyama** for the benefit of optimizing computationally expensive Navier-Stokes code using evolutionary algorithms, which have been proven to be robust, parallizable, and highly efficient (**Oyama** §1).

15

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Jin (USPGP 2002/0099929)
- Cvetkovic ("Genetic Algorithm-based Multi-objective Optimisation and Conceptual Engineering Design")

20

Claims 11-20 are rejected.

Correspondence Information

25 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin Buss whose telephone number is 571-272-5831. The examiner can normally be reached on M-F 9AM-5PM.

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As detailed in MPEP 502.03, communications via Internet e-mail are at the discretion of the applicant.

Without a written authorization by applicant in place, the USPTO will not respond via Internet e-mail to any Internet correspondence which contains information subject to the confidentiality requirement as set forth in 35 U.S.C. 122.

A paper copy of such correspondence will be placed in the appropriate patent application. The following is a sample

5 authorization form which may be used by applicant:

"Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

10 If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or
15 Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Benjamin Buss
Examiner
Art Unit 2129

/BB/


DAVID VINCENT
SUPERVISORY PATENT EXAMINER